Packet Networking Portfolio Platforms

Product and Technical Marketing

March 2020

3902 Service Delivery Switch
Single Port Ethernet Demarcation

Service Aware OS - SAOS:

- 802.1Q VLANs, Q-in-Q
- MEF EPL, EVPL & E-LAN
- IEEE 802.3ah link layer OAM
- IEEE 802.1ag Connectivity Fault Management
- ITU-T Y.1731 Performance Monitoring: Delay, Jitter, Loss
- RFC 2544 Reflector for Performance Measurement

Packaging

- Desktop or Wall-mount
  - Small and Lightweight
  - Dimensions - 1.12"H x 5.9"W x 5.9"D

- External AC brick Power Supply
- 0C to +40C temperature range
- Fan-less design
- Front Access to all power and data interfaces on the product for easy desktop or wall-mount scenarios

Cost-effective yet advanced single port service delivery device

NNI	UNI
1	1
1G	10/100/1000M
SFP	RJ-45

3903 Service Delivery Switch
Resilient SMB Ethernet Service Demarcation

Service Aware OS - SAOS:

- 802.1Q VLANs, Q-in-Q
- MEF 2.0 E-LINE, E-LAN, E-TREE Services
- ITU-T Y.1731 Performance Monitoring: Delay, Jitter, Loss
- RFC 2544/Y.1564 Performance Reflector & Generator
- IEEE 802.3ah link layer OAM
- IEEE 802.1ag Connectivity Fault Management

AC Packaging

- Desktop or Wall-mount or rack-mount kit
- Small and Lightweight design
- Dual internal AC Power Supplies
- 0C to +40C temperature range
- Front Access to all power and data interfaces

DC Packaging

- 1RU rack-mount
- Small and Lightweight design
- Dual internal DC Power Supplies (48V)
- 0C to +40C temperature range
- Front Access to all power and data interfaces

Inexpensive yet advanced single port service delivery device

NNI	UNI
2	1
1G/100M	1G/100M
SFP	SFP / RJ45

3903x Small NTE

Desk mount shown
Also wall-mountable

Small Ethernet NTE

Service Aware OS - SAOS:
- 802.1Q VLANs, Q-in-Q
- MEF 2.0 E-LINE, E-LAN, E-TREE Services
- ITU-T Y.1731 Performance Monitoring: Delay, Jitter, Loss
- RFC 2544/Y.1564 Performance Reflector & Generator
- IEEE 802.3ah link layer OAM
- IEEE 802.1ag Connectivity Fault Management

User-Friendly packaging
- Desktop or Wall-mount
- Small and Lightweight design
- 0C to +40C temperature range
- Front Access to all power and data interfaces

Fanless, Passive cooling
- Silent operation

External AC Power supply

NNI	UNI
2	1
1G/100M	1G/100M
SFP	SFP / RJ45

3904 Service Delivery Switch
Timing delivery for small cell backhaul

Service Aware OS - SAOS:
- Virtual Switching Architecture
- MEF 2.0 E-LINE, E-LAN, E-TREE Services
- Flexible UNI Classification: EPL, EVPL, Hybrid
- Encapsulations: 802.1Q-in-Q, G.8032

Stringent clocking/synchronization
- Synchronization via BITS, Synch-E or 1588v2
- External sync inputs/outputs (BITS, 10MHz, 1PPS, ToD)

Sophisticated OAM capabilities
- ITU-T Y.1731 Performance Monitoring: Delay, Jitter, Loss
- RFC 2544/Y.1564 Performance Generator & Reflector
- IEEE 802.3ah link layer OAM
- IEEE 802.1ag Connectivity Fault Management
- IETF TWAMP Sender & Responder for L3 SLA Monitoring
- Hardware Ethernet OAM

Redundant Dual Fixed AC or DC power supplies
Wire-speed L2 switching with 4 Gbps fabric

NNI/UNI	UNI	Sync
2	2	External
1G/100M	1G/100M	BITS, 1pps, ToD, Freq.
SFP	SFP / RJ45	RJ45, mini coax

3905 Service Delivery Switch
Outdoor & unconditioned indoor locations

Service Aware OS (SAOS):
- Virtual switching architecture
- E-LINE, E-LAN, E-Tree, and E-Access services
- Encapsulation (802.1Q-in-Q, G.8032)

Sophisticated OAM Capabilities
- ITU-T Y.1731 performance monitoring (delay, jitter, loss)
- RFC 2544/Y.1564 performance (generator, reflector)
- IEEE 802.3ah link layer OAM
- IEEE 802.1ag Connectivity Fault Management
- IETF TWAMP sender/responder for L3 SLA monitoring
- Hardware-based Ethernet OAM

Interface Flexibility
- 1G/100M Fiber handoffs or 10/100/1000Base-T Copper
- IEEE802.3at PoE+ Power Sourcing Equipment (PSE)

Stringent synchronization via Synch-E & 1588v2

Deployable into any location
- Environmentally sealed package
- -40C to +65C temperature range
- Built-in Fixed AC, DC or Cable-AC power supply

WiFi-based management console port access*
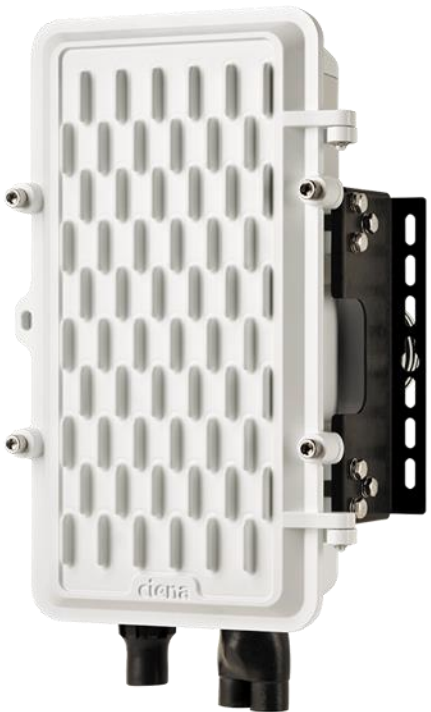
NNI	UNI
2	2
100/1000M	10/100/1000M
SFP	SFP / RJ45

* Not intended to be used as a WiFi hot spot

3906 Platform
Next Gen CPE: Packet NID + NFV host

- **Low First-in Cost L2 CPE: 6xGbE**
- **Ciena SAOS advanced QoS, OAM, protection**
- **Incremental right-sized x86 NFV server (x86 Broadwell Merchant Multi-Core Compute with RAM & SSD), modules (Medium and Large options)**
- **Optional Distributed NFV Software**

Flexible Module		
x86		
Medium		
Large		

NNI/UNI	UNI	UNI
2	2	2
100M/1G	100/1G	10/100/1G
SFP	SFP/RJ-45	

3916 Service Delivery Switch
Small Ethernet Demarcation

GigE services via compact form factor

Service Aware OS - SAOS:
- Virtual Switching Architecture
- E-LINE and E-LAN Services
- Flexible UNI Classification: EPL, EVPL, Hybrid
- Encapsulations: 802.1Q-in-Q, G.8032, MPLS

Sophisticated OAM capabilities
- IEEE 802.3ah link layer OAM
- IEEE 802.1ag Connectivity Fault Management
- ITU-T Y.1731 Performance Monitoring: Delay, Jitter, Loss
- IETF TWAMP Sender & Responder for L3 SLA Monitoring
- RFC 2544 Generator & Reflector for Performance Measurement
- Hardware Ethernet OAM

1 RU / ~11" Width / ETSI Form Factor [Note]

Front access to all power, data, and management

Integrated universal AC or Integrated universal DC variants

0 to +50C temperature range

Wire-speed L2 switching with 6 Gbps fabric

NNI	UNI
2	4
1G	10/100/1000
SFP	(4) SFP (2) RJ-45

Note: 11" width for AC and dual-AC
13" width for DC

3926 Platform
10G NTE & NFV Server

NTE Highlights

- **10GE Access - 8 Fiber ports (6 X 10GE/1GE & 2 x 1GE)**

- **MPLS, Advanced Ethernet, OAM & Zero Touch Provisioning**

- **Advanced QoS with Per-EVC Egress Shaping**

- **HW OAM with RFC2544 Generator and Reflector to 10G**

- **Same Intel x86 Broadwell module (Medium and Large) as 3906**

- **SyncE & 1588v2 PTP**

- **Pluggable AC/DC Redundant Power Extended Temp -40 to 65°C**
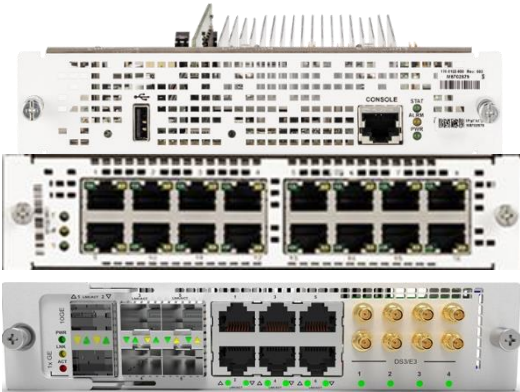
Flexible Module		
x86	CEM	Combo
Medium	16 x T1/E1	6x DS1/E1 + 4x DS3/E3 + 4x OC3/12 /STM1/4 or 1x OC48/STM16
Large		

NNI/UNI	UNI	UNI
6	2	2
1G/10G	100/1G	10/100/1G
SFP+	SFP	

3928 Platform
Cost-effective, high-volume service delivery

- **MPLS, advanced Ethernet, OAM & Zero Touch Provisioning**

- **Advanced QoS with Per-EVC Egress shaping**

- **HW OAM with 10G Service Activation Test engine**

- **Power supply & operating temperature variants:**
  - **Fixed Dual DC - Extended Temp -40 to 65°C**
  - **Fixed Dual AC – Commercial Temp 0 to 50°C**

- **SyncE & 1588 PTP   (DC Model)**

NNI/UNI	UNI
4	8
1G/10G	1G
SFP+	SFP

3930 Service Delivery Switch
Universal Business/Wireless Demarcation

Service Aware OS - SAOS:
- Virtual Switching Architecture
- E-LINE and E-LAN Services
- Flexible UNI Classification: EPL, EVPL, Hybrid
- Encapsulations: .802.1Q-in-Q, G.8032, MPLS
- Optional Synchronous Ethernet & IEEE 1588v2 (Stratum 3E)
- G.8032 Ethernet Ring Protection

Sophisticated OAM capabilities
- IEEE 802.3ah link layer OAM
- IEEE 802.1ag Connectivity Fault Management
- ITU-T Y.1731 Performance Monitoring: Delay, Jitter, Loss
- IETF TWAMP Sender & Responder for L3 SLA Monitoring
- RFC 2544 Generator & Reflector for Performance Measurement
- Hardware Ethernet OAM

Designed for Uncontrolled Environments
- -40C to +65C outside plant temperature range
- External Alarm inputs

Redundant AC or DC power supplies

Wire-speed L2 switching with 28 Gbps fabric

NNI/UNI	UNI
2	8
1G/10G	100/1G
SFP+	(8) SFP (4) RJ

3931 Service Delivery Switch
Weather-Proof Business & Wireless Backhaul

Service Aware OS - SAOS:
- Virtual Switching Architecture
- E-LINE and E-LAN Services
- Encapsulations: 802.1Q-in-Q, G.8032, MPLS
- Flexible UNI Classification: EPL, EVPL, Hybrid
- Optional Synchronous Ethernet & IEEE 1588v2 (Stratum 3E)
- G.8032 Ethernet Ring Protection

Sophisticated OAM capabilities
- IEEE 802.3ah link layer OAM
- IEEE 802.1ag Connectivity Fault Management
- ITU-T Y.1731 Performance Monitoring: Delay, Jitter, Loss
- IETF TWAMP Sender & Responder for L3 SLA Monitoring
- RFC 2544 Generator & Reflector for Performance Measurement
- Hardware Ethernet OAM

Deployable into any location
- Environmentally sealed package
- -40C to +65C temperature range
- Integrated protection for customer drops

Redundant AC or DC power supplies
- Universal DC (-48V, -24V, +24V) or AC (100V, 240V)

Wire-speed L2 switching with 28 Gbps fabric

Pole, H-Frame & Wall Mount		
NNI/UNI	UNI	UNI
2	4	4
1G/10G	100/1G	10/100/1G
SFP+	SFP	RJ-45

3942 Service Delivery Switch
MDU/MTU Copper Demarcation

Service Aware OS - SAOS:
- Virtual Switching Architecture
- MEF 2.0 E-LINE, E-LAN, E-TREE Services
- Flexible UNI Classification: EPL, EVPL, Hybrid
- Networking – 802.1Q-in-Q, G.8032, MPLS–TP

Sophisticated OAM capabilities
- ITU-T Y.1731 Performance Monitoring: Delay, Jitter, Loss
- RFC 2544/Y.1564 Performance Generator & Reflector
- IEEE 802.3ah link layer OAM
- IEEE 802.1ag Connectivity Fault Management
- IETF TWAMP Sender & Responder for L3 SLA Monitoring
- Hardware Ethernet OAM

Redundant Dual Fixed AC or DC power supplies

Packaged for Controlled Environments
- 0C to +65C temperature range
- Rack-mount or Wall-mount Configuration

Five 9s+ Reliability

Wire-speed L2 switching with 60 Gbps fabric
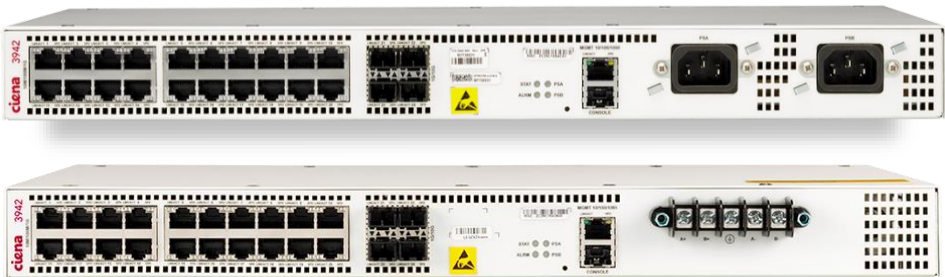
NNI/UNI	UNI
4	20
1G/10G	10/100/1000M
SFP+	RJ-45

5142 Service Aggregation Switch
Premium 1G/10G Service Delivery/Aggregation

Service Aware OS - SAOS:
- Virtual Switching Architecture
- MEF 2.0 E-LINE, E-LAN, E-TREE Services
- Flexible UNI Classification: EPL, EVPL, Hybrid
- Networking – 802.1Q-in-Q, G.8032, MPLS–TP

Sophisticated OAM capabilities
- IEEE 802.1ag & ITU-T Y.1731;Hardware Ethernet OAM
- RFC 2544/Y.1564 Generator & Reflector
- IEEE 802.3ah link layer OAM
- IETF TWAMP Sender & Responder for L3 SLA Monitoring

Stringent clocking/synchronization
- Stratum 3E accuracy
- Synchronization via BITS, 1588v2 or Synch-E
- External sync inputs/outputs (BITS, 10MHz, 1PPS, ToD)
- 1588v2 OC & BC

Compact 1RU ETSI Form-Factor

-40C to +65C outside plant temperature

Redundant AC or DC power supplies

Wire-speed L2 switching with 60 Gbps fabric

NNI/UNI	UNI	Sync
4	20	External
10G/1G	1G/100M	BITS, 1pps, ToD, Freq.
SFP+/SFP	SFP	RJ45, mini coax

5144 10G Aggregation Platform

Delivers high capacity, low power in a compact footprint

Built-in dual power AC/DC   **Front to Back Cooling**

252mm depth

(20) 1G SFP   **(8) 10G/1G SFP+**   **Mgmt & Timing**

Powered by Ciena's Service Aware OS

📊 TELEMETRY / MANAGEMENT

- gRPC Streaming Telemetry
- Netconf/YANG, PCE Ready
- IPv4/IPv6 Mgmt
- Zero-Touch Provisioning (ZTP)

🕐 SYNCHRONIZATION

- G.8275, IEEE 1588v2
- Sync-E, Frequency, 1PPS, GNSS

⬡ SERVICES

- L3VPN, L2VPN
- 6PE/6VPE, SR-MPLS, BGP-LU
- Route Reflector
- 10GE Y.1564/RFC 2544 Engine, TWAMP

▦ BUFFERED LEAF/AGGREGATION

- Customizable Buffers, Low-Latency to Extra Deep
- Hierarchical Ingress Metering & Egress Shaping

🔌 POWER

- Dual Power Supplies
  - AC 100 Volts to 240 volts AC
  - DC -36 to -60 VDC

🖳 SILICON

- 120G Qumran-UX Switch Fabric
- Scalable OAM/Statistics hardware assist engines

🌡 THERMALS

- Temperature Hardened -40°C to +65°C

5150 Service Aggregation Switch
Extended Temperature High-Density Aggregation

Enables 1G → 10G aggregation in cabinets and uncontrolled environments

Service Aware OS - SAOS:

- Virtual Switching Architecture
- E-LINE and E-LAN Services
- Flexible NNI Encapsulation
- Flexible UNI Classification: EPL, EVPL, Hybrid
- Hardware Accelerated OAM

Enhanced Resiliency via MPLS/H-VPLS

- MPLS ping, Traceroute, backup LSPs, & MPLS FRR

Sophisticated OAM capabilities

- IEEE 802.3ah link layer OAM, IEEE 802.1ag Connectivity Fault Management
- ITU-T Y.1731 Performance Monitoring: Delay, Jitter, Loss
- IETF TWAMP Sender & Responder for L3 SLA Monitoring
- IEEE 1588v2, Synchronous Ethernet (hardware ready)

Universal Deployment Options in 2RU ETSI Form-Factor

- Redundant AC or Wide Range DC power supplies
- -40C to +65C outside plant temperature

Wire-speed L2 switching with 88 Gbps fabric

NNI/UNI	UNI
Up to 4	48
10G	100M/1G
XFP	SFP

5160 Service Aggregation Switch
High Density 10G Aggregation

Service Aware OS - SAOS:
- Virtual Switching Architecture
- E-LINE and E-LAN Services
- Flexible UNI Classification: EPL, EVPL, Hybrid
- Encapsulations: 802.1Q-in-Q, G.8032, MPLS

Enhanced Resiliency via G.8032, PBB-TE & MPLS/H-VPLS
- PBB-TE CFM, PBB-TE backup tunnels, PBB-TE dual homing
- MPLS ping, Traceroute, backup LSPs, & MPLS FRR

Sophisticated OAM capabilities
- IEEE 802.3ah link layer OAM
- IEEE 802.1ag Connectivity Fault Management
- ITU-T Y.1731 performance monitoring: delay, jitter, loss
- IETF TWAMP sender & responder for L3 SLA monitoring
- RFC 2544 generator & reflector for performance measurement
- Hardware assisted Ethernet OAM

Compact 1RU ETSI form-factor

Redundant AC or DC power supplies

-40C to +65C outside-plant temperature

Wire-speed L2 switching with 240 Gbps fabric

NNI/UNI	Sync
24	External
1G/10G	BITS, 1pps, ToD, Freq.
SFP/SFP+	RJ45, mini coax

5162 Platform

Delivers high capacity, low power in a compact footprint

Powered by Ciena's Service Aware OS

TELEMETRY / MANAGEMENT

- gRPC Streaming Telemetry
- Netconf/YANG, PCE Ready
- IPv4/IPv6 Mgmt
- Zero-Touch Provisioning (ZTP)

SYNCHRONIZATION

- G.8275, IEEE 1588v2
- Sync-E, BITS, Frequency, 1PPS

SERVICES

- L3VPN, L2VPN
- 6PE/6VPE, SR-MPLS, BGP-LU
- Route Reflector
- 100GE Y.1564/RFC 2544 Reflector, TWAMP

BUFFERED LEAF/AGGREGATION

- Customizable Buffers, Low-Latency to Extra Deep
- Hierarchical Ingress Metering & Egress Shaping

Pluggable dual power   **Front to Back Cooling**

560mm depth

(8) 25G/10G/1G SFP28
(32) 10G/1G SFP+   **(2) 100G NNI QSFP28**   **Mgmt & Timing**

COOLING

- (5) redundant fans, factory populated
- Field-replaceable
- No impact to operation upon single fan failure

POWER

- Dual Power Modules (Field Replaceable)
  - AC 100 Volts to 240 volts AC
  - DC -36 to -60 VDC
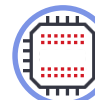
SILICON

- 300G Qumran-AX Switch Fabric
- Intel x86 CPU

5164 Network Slicing Router

cost-effective 10GE/25GE to 100GE/200GE aggregation

Built-in dual power AC/DC   **Fixed fans**   **GNSS/Timing & Mgmt**

250mm depth

(32) SFP28
(25G/10G/1G)

(4) QSFP56/QSFP28
(200G/100G)

Powered by Ciena's Service Aware OS

TELEMETRY / MANAGEMENT

- gRPC Streaming Telemetry
- Netconf/YANG, PCE Ready
- IPv4/IPv6 Mgmt, Zero-Touch Provisioning

SYNCHRONIZATION

- G.8275, IEEE 1588v2
- GNSS, Sync-E, Frequency, 1PPS

SERVICES

- Ethernet, Flex-E/G.mtn
- L3VPN, L2VPN
- 6PE/6VPE, SR-MPLS, BGP-LU, EVPN
- Hard Slicing via Flex-E/MTN Path cross connection

BUFFERED LEAF/AGGREGATION

- Customizable Buffer Management
- Low-Latency to Extra Deep

SILICON

- 800G Qumran2a Switch Fabric
- Quad-core ARM CPU

THERMALS

- Industrial Temperature -40°C to +65°C

5166 Network Slicing Router

*cost-effective 10GE/25GE to 100/200/**400GE** aggregation*

Built-in dual power AC/DC   **Fixed fans**   **GNSS/Timing & Mgmt**

250mm depth

(32) SFP28
(25G/10G/1G)

(2) QSFP-DD
(100G/200G/400G)

Powered by Ciena's Service Aware OS

TELEMETRY / MANAGEMENT

- gRPC Streaming Telemetry
- Netconf/YANG, PCE Ready
- IPv4/IPv6 Mgmt, Zero-Touch Provisioning

SYNCHRONIZATION

- G.8275, IEEE 1588v2
- GNSS, Sync-E, Frequency, 1PPS

SERVICES

- Ethernet, Flex-E/G.mtn
- L3VPN, L2VPN
- 6PE/6VPE, SR-MPLS, BGP-LU, EVPN
- Hard Slicing via Flex-E/MTN Path cross connection

BUFFERED LEAF/AGGREGATION

- Customizable Buffer Management
- Low-Latency to Extra Deep

SILICON

- 800G Qumran2a Switch Fabric
- Quad-core ARM CPU

THERMALS

- Industrial Temperature -40°C to +65°C

5168 5G xHaul Slicing Router

CPRI, RoE and eCPRI Fronthaul Services with cost-effective 10GE/25GE to 100GE/200GE aggregation

Built-in dual power AC/DC **Fixed Fans** **GNSS/Timing & Mgmt.**

300mm depth

(4) QSFP56/QSFP56
(200G/100G)

(14) SFP28
(25GE/10GE/1GE)

(18) SFP28
CPRI or (25GE/10GE/1GE)
(12) CPRI L1 offload capable

Powered by Ciena's Service Aware OS

TELEMETRY / MANAGEMENT
- gRPC Streaming Telemetry
- Netconf/YANG, PCE Ready
- IPv4/IPv6 Mgmt, Zero-Touch Provisioning

SYNCHRONIZATION
- G.8275, IEEE 1588v2
- GNSS, Sync-E, 1PPS

SERVICES
- TSN, Ethernet, Flex-E/G.mtn
- L3VPN, L2VPN
- 6PE/6VPE, SR-MPLS, BGP-LU, EVPN
- Hard Slicing via Flex-E/SCL cross connection

BUFFERED LEAF/AGGREGATION
- Customizable Buffer Management
- Low-Latency to Extra Deep
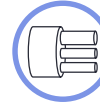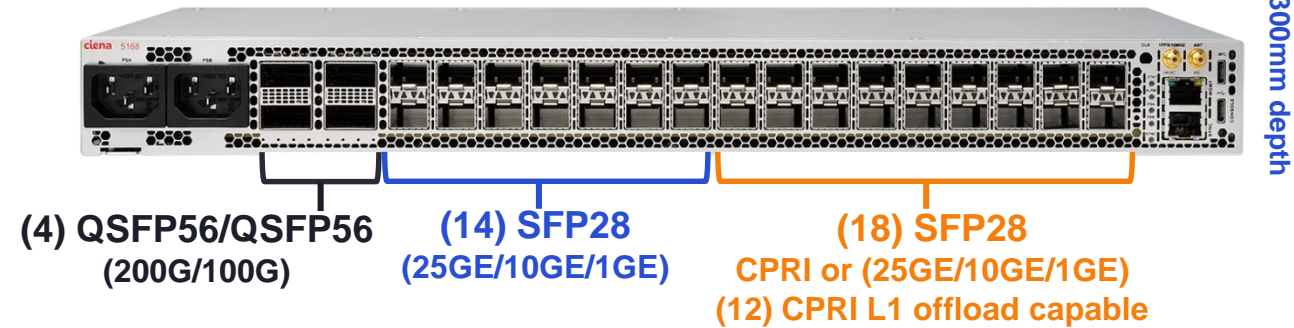
FRONTHAUL SERVICES
- CPRI options 3, 5, 7, 8 support
- eCPRI options 7 (FD) and 8 (TD) support
- ROE mapping
  - Structure-agnostic, structure-aware
- CPRI to eCPRI interworking (IWF)
- CPRI to ORAN including L1 Offload processing

SILICON
- 800G Qumran2a Switch Fabric
- CPRI/RoE/eCPRI Fronthaul Processor

THERMALS
- Industrial Temperature -40°C to +65°C

5170 Platform

Delivers high capacity, low power in a compact footprint

Pluggable dual power   **Front to Back Cooling**

560mm depth

(40) 10G/1G SFP28+   (4) 100G NNI QSFP28   **Mgmt & Timing**

Powered by Ciena's Service Aware OS

TELEMETRY / MANAGEMENT
- gRPC Streaming Telemetry
- Netconf/YANG, PCE Ready
- IPv4/IPv6 Mgmt
- Zero-Touch Provisioning (ZTP)

SYNCHRONIZATION
- G.8275, IEEE 1588v2
- GNSS, Sync-E, BITS, Frequency, 1PPS

SERVICES
- L3VPN, L2VPN
- 6PE/6VPE, SR-MPLS, BGP-LU
- Route Reflector
- 100GE Y.1564/RFC 2544 Engine, TWAMP

BUFFERED LEAF/AGGREGATION
- Customizable Buffers, Low-Latency to Extra Deep
- Hierarchical Ingress Metering & Egress Shaping

COOLING
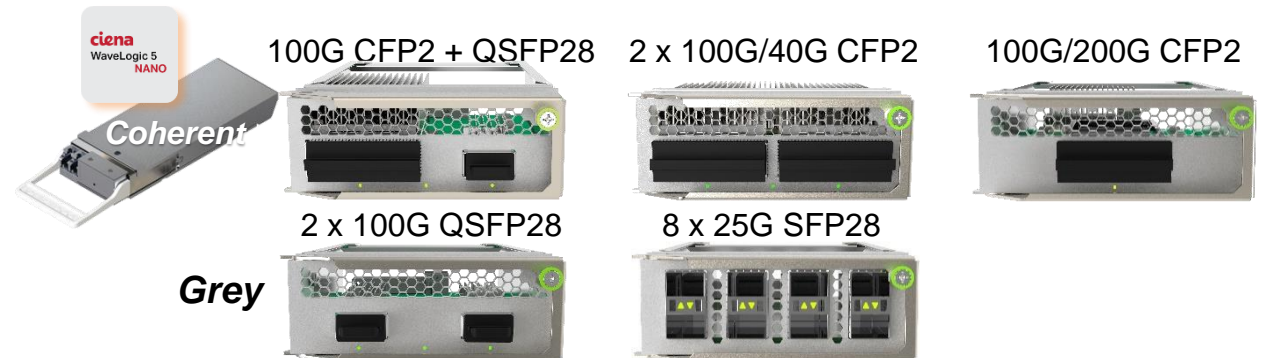- (5) redundant fans, factory populated
- Field-replaceable
- No impact to operation upon single fan failure

POWER
- Dual Power Modules (Field Replaceable)
  - AC 100 Volts to 240 volts AC
  - DC -36 to -60 VDC

SILICON
- 800G Qumran-MX Switch Fabric, Intel x86 CPU
- Scalable OAM/Statistics hardware assist engines

5171 Platform

Delivers high capacity, low power in a compact footprint

Pluggable dual power   **(2) 200G NNI Modules**

254mm depth

Mgmt & Timing   **(36) 10G/1G SFP+**   **(4) 25G/10G/1G SFP28+**

Powered by Ciena's Service Aware OS

TELEMETRY / MANAGEMENT

- gRPC Streaming Telemetry
- Netconf/YANG, PCE Ready
- IPv4/IPv6 Mgmt, Zero-Touch Provisioning

SYNCHRONIZATION

- G.8275, IEEE 1588v2
- GNSS, Sync-E, BITS, Frequency, 1PPS

SERVICES

- L3VPN, L2VPN
- 6PE/6VPE, SR-MPLS, BGP-LU
- Route Reflector
- 100GE Y.1564/RFC 2544 Engine, TWAMP

BUFFERED LEAF/AGGREGATION

- Customizable Buffers, Low-Latency to Extra Deep
- Hierarchical Ingress Metering & Egress Shaping

Coherent

100G CFP2 + QSFP28   2 x 100G/40G CFP2   100G/200G CFP2

2 x 100G QSFP28   8 x 25G SFP28

Grey

WAVELOGIC

- WaveLogic Coherent Pluggables CFP2 DCO
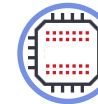
SILICON

- 800G Qumran-MX Switch Fabric, Intel x86 CPU
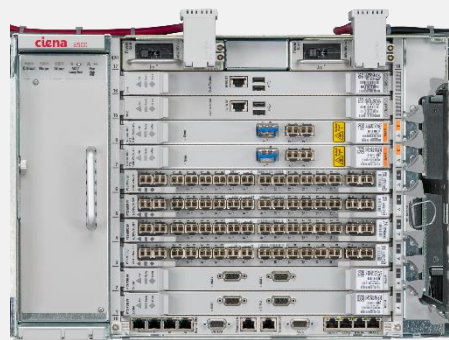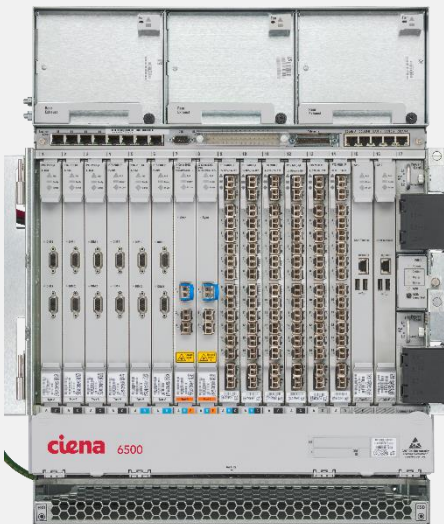- Scalable OAM/Statistics hardware assist engines

THERMALS

- Temperature Hardened -40°C to +65°C

6500 Packet Transport System: Circuit Emulation and Packet Services

6500 PTS

6500-S8

6500-S14
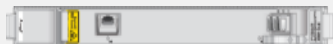
Unique Advantages of the 6500 Packet Transport System (PTS)

Up to **5x lower power and 10x space savings** using 1:n PDH protection for 3/1 DACS application.

Up to **4x more TDM circuit emulation capacity** than competition, with unrestricted 20G capacity per slot.

Delivers **next-gen MPLS transport and switching** with control plane, seamless MPLS & segment routing.

New 6500 PTS Modules

Fabric

X-Conn 800G PTS
1xQSFP28/2xSFP+

Ethernet

PTS ETH I/F 40G 16 Port
(4xSFP+/16xCSFP)

PTS ETH I/F 100G 12 Port
(2xQSFP28/10xSFP+)

MRO
Multi-Rate Optical

PTS MRO I/F 16xSFP

PDH

PTS PDH I/F 2xDIM

PTS PDH I/F 10xDIM 1:N

84xDS1/E1 DIM

24xDS3/E3/EC1 DIM
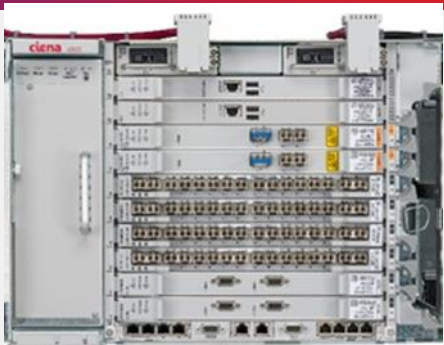
DWDM

OTR WL3n Enh 1xQSFP28

6500 Packet Transport System (PTS): Packet Services and Circuit Emulation
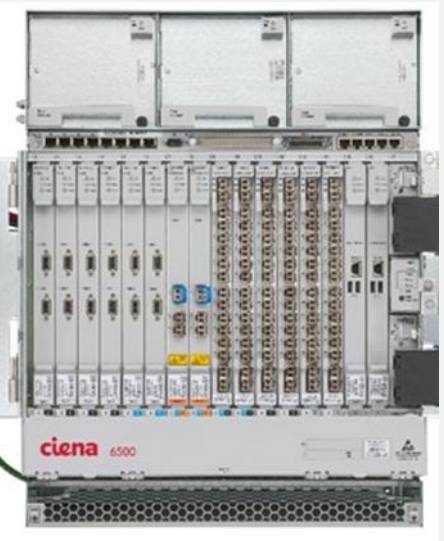
Built on a solid 6500 S-Series foundation

Chassis
Existing 6500 S-series

6500-S8

6500-S14

Fabric and Ethernet Circuit Packs

Fabric

NTK614AA

800G packet switch with mesh interface to mate
- 480G throughput at 64-byte frames
- NPU based packet assist

1x100G/40G or 2x10G uplink ports
- QSFP28/+: 100GE/OTU4(100GE) or 40GE/OTU3(40GE)
- SFP+: 2x10GE/2xOTU2/2e(10GE)

Quad core compute complex
- SAOS, MPLS control plane

PTP Synchronization support
- IEEE1588v2 GM, BC, OC

**X-Conn 800G PTS
1xQSFP28/2xSFP+**

Ethernet

NTK695AA

4xSFP+
- 10GE SFP+ (4 ports)

16xSFP/CSFP
- 10/100BaseT SFP (16 ports)
- 100FX SFP (16 ports)
- GE SFP (16 ports)
- GE CSFP (32 ports)

Future

**PTS ETH I/F 40G 16 Port
(4xSFP+/16xCSFP)**

NTK696AA

1x100GE or 2x40GE or 10x10GE client ports
- QSFP28: 1x100GE (1 port only)
- QSFP+: 1x40GE or 4x10GE (2 ports)
- SFP+: 10x10GE (10 ports)

100G bandwidth supported in slots 3,4,5 and 6 only
- 1x40GE or 4x10GE supported in all other slots

Future

**PTS ETH I/F 100G 12 Port
(2xQSFP28/10xSFP+)**

6500 Packet Transport System (PTS): Packet Services and Circuit Emulation
Built on a solid 6500 S-Series foundation

Circuit Emulation

Optical/ Ethernet Circuit Pack

NTK691AA

Sixteen independently configurable ports:
- OC-3/12/STM-1/4 (maximum 16 ports)
- OC-48/STM-16 (maximum 8 ports)
- OC-192/STM-64 (maximum 2 ports)
- 100FX/GE/ (maximum 16 ports)
- 10/100/1000BaseT support via appropriate SFP
- 10GE (maximum 2 ports)

20G TDM HO, LO or PDH Circuit Emulation
- HO: STS-1/3c/12c/48c/VC4/VC4-4c/VC4-16c
- LO: VT-1.5/2/VC11/12
- PDH: DS3, DS3 M13, DS1, E1, E3

60G HO TDM XC
- 1+1 APS/MSP
- UPSR/SNCP

PTS MRO I/F 2xSFP+/14xSFP

PDH Modules

NTK604AA

84xDS1/E1 DIM

NTK604BA

24xDS3/E3/EC1 DIM

Distributed I/O Modules (DIM) for:
- 84x DS1 or E1 signals
- 24x DS3, E3 or EC1 signals

2RU in height, 19" rack mountable, 7" depth

Passively cooled and powered from PTS PDH I/F card

Mountable for front or rear copper access with DIM link to host shelf routed through the appropriated side

DS1/ E1: 110Ω copper interface (100Ω DS1, 120Ω E1)
- 6x 64-pin Telco (Champ) Female connectors
- Left and right routing with same right-angled cables

DS3/ E3: 75-ohm interface
- 48 Mini-BNC connectors (24 Tx, 24 Rx)

Configurable Line Build Out (LBO) and signal encoding

PDH Circuit Packs

NTK690AA

168x DS1 or E1 signals (selectable per LIU)

48x DS3, E3 or EC1 (selectable per LIU)

DS1: MEF8, SAToP, CESoPSN (DS0)

E1: MEF8, SAToP, CESoPSN (DS0)

DS3/E3: MEF8, SAToP

EC1 (STS-1, VT-n): MEF3, CEP

Unprotected or 1:1 protected PDH configurations

PTS PDH I/F 2xDIM

NTK690PA

Supports up to a maximum of 5 working cards
- Reuse PTS PDH I/F 2xDIM as working card
- Reuse 84xDS1/E1 DIM and 24xDS3/E3/EC1 DIM

DS1: MEF8, SAToP, CESoPSN (DS0)

E1: MEF8, SAToP, CESoPSN (DS0)

DS3/E3: MEF8, SAToP

EC1 (STS-1, VT-n): MEF3, CEP

PTS PDH I/F 10xDIM 1:N Protection

8180 Coherent Networking Platform

Delivers high capacity, low power in a compact footprint

(32) QSFP28/QSFP+   **Mgmt & Timing Ports**

540mm depth

Powered by Ciena's Service Aware OS

TELEMETRY / MANAGEMENT

- gRPC Streaming Telemetry
- Netconf/YANG
- IPv4/IPv6 Mgmt, Zero-Touch Provisioning

SYNCHRONIZATION

- G.8275, IEEE 1588v2
- Sync-E, BITS, Frequency, 1PPS

WAVESERVER AI PEERING, BANDWIDTH ON DEMAND

- Integrated optical test set
- Active Optical Cable (FEC on/off)
- WaveLogic Capacity in 100G increments

OPTICAL PROVISIONING

- Flex grid channel provisioning
- Multi-layer provisioning via single interface

MULTI-TERABIT SPINE

- Geographically dispersed deployments

(4) 800G Field Replaceable Units (FRUs)
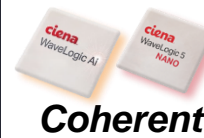
| | 1 x 100G-400G | 1 x 200G-800G | 2 x 100G-400G | 2-4 x 100G-200G |

Coherent

| 2 x 400G | 8 x QSFP-DD |
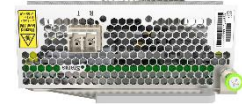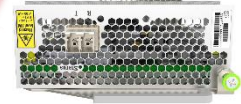
Grey

WAVELOGIC

- WaveLogic tunable capacity up to 800G

SILICON

- 6.4Tbps Tomahawk3 Switch Fabric
- Intel x86 CPU

THERMALS

- Commercial Temperature 0 to +40°C

8700 Packetwave
Multi-Terabit Modular Switch

	4-Slot	10-Slot
Rack Units	6	10
Switching Capacity	800G → 2.7T	2T → 6.8T
Slot Capacity	200G → 680G	200G → 680G
Common Cards	3	3
Line Modules	4	10
10GbE	80 → 130	200 → 300
1GbE	80 → 130	200 → 300
100GbE	8 → 24	20 → 60
40GbE	8 → 32	20 → 80
100G DWDM (WaveLogic 3)	8	20

Transforming how Metro Networks are designed, deployed, and managed

8700 Packet Service Line Modules (PSLM)

Ports	Type
20	10G / 1G SFP/SFP+

PSLM-200-20

Ports	Type
2	100G / 40G CFP

PSLM-200-2

Ports	Type
10	10G / 1G SFP+/SFP
1	100G QSFP28

PSLM-200-11

Ports	Type
30	10G / 1G SFP+/SFP
1	100G QSFP28

PSLM-400-31

Ports	Type
6	40G/100G QSFP+/QSFP28
2	40G QSFP+

PSLM-680-8

8700 Coherent Service Line Module (CSLM)

WaveLogic 3 NANO

- Full 200GbE switch fabric access

- 200G Hardware based packet processing

- 2 x 100GbE fixed LC-based optics

- Hardware based packet OAM

- OTU-4 wrapped, coherent 100G tunable DWDM

- Hitless hot swappable line module

CSLM-200-2

2 x 100G WaveLogic 3 Nano DWDM

50GHz, 100GHz, gridless

WaveLogic Photonics compatible

120km unamplified, 1000km amplified

Compatible with 4-slot and 10-slot chassis

No stranded capacity; no loss of 100GE density

Combining the best of packet switching, coherent 100G DWDM, and WaveLogic Photonics

TDM over Packet
Ciena's TDM SFP Family

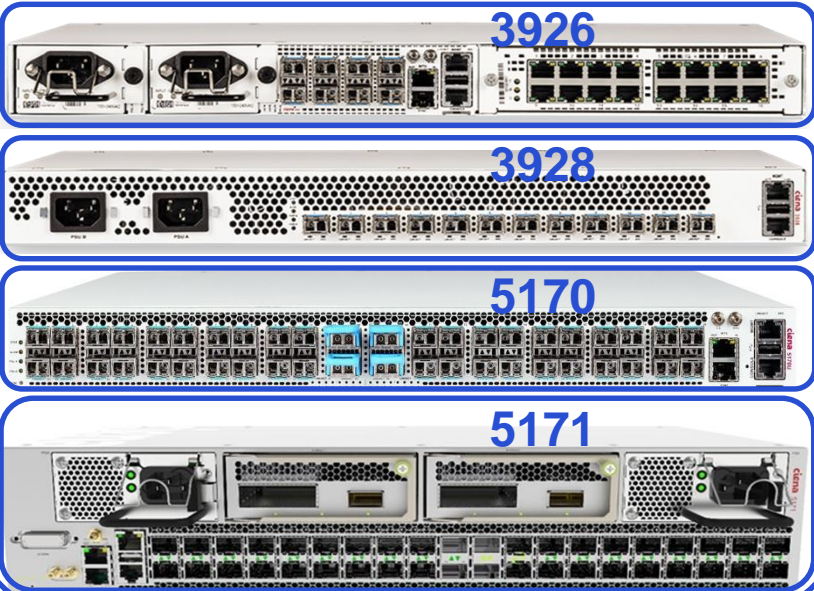| Part Number	Rate	Description	Channelization
XCVR-CEP001	OC-3 STM-1	Virtual Container over Packet (VCoP) SFP	STS-1/ STS-3c
XCVR-CEP002	OC-3/12 STM-1/STM-4	Virtual Container over Packet (VCoP) SFP	STS-1/STS-3c STS-12c
XCVR-CEP003	DS3	Virtual Container over Packet (VCoP) SFP	STS-1
XCVR-GES101	STM-1	Channelized SONET/SDH over Packet SFP	E1
XCVR-TDM2GE	E1	Transparent PDH over Packet SFP	E1
XCVR-TDM4GE*	DS1	Transparent PDH over Packet SFP	DS1

Available on
• 3904• 3905• 3926• 3928• 3930-930 • 3932• 5142• 5160

Ciena Platforms that support Adaptive IP

SAOS 10.x Native

D-NFVI

5164

5166

5168

5144

5162

8180

SAOS 10.x Option

3926

3928

5170

5171
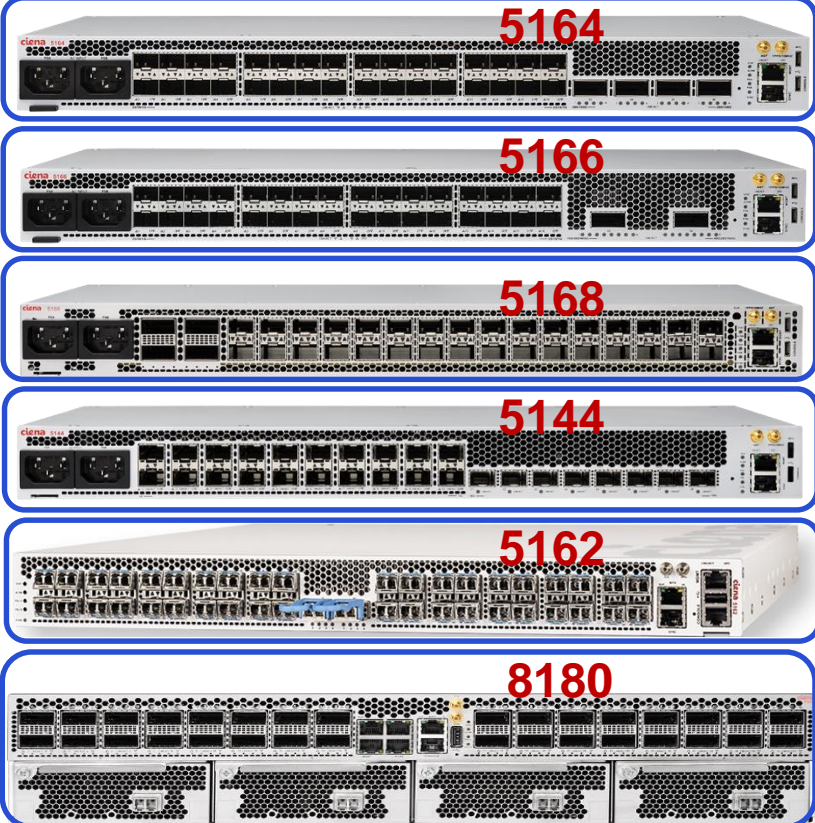
Ciena D-NFV Solution
CPE in a Virtual Form Factor

Blue Planet Orchestration

3rd Party VNF (SD-WAN or Router)

3rd Party VNF (Firewall)

3rd Party VNF (Encryption)

Ciena Distributed NFVI Agent

Ciena Virtual Switch (vSwitch)

Ciena Base Virtualization OS

3906

3926

COTS

NFV Orchestration VNF Management

Simple direct orchestration via Netconf/Yang API over SSH

MEF 2.0 compliant DPDK accelerated Virtual Switch

Ciena distribution of Open Network Linux with KVM

Carrier Grade Networking with Rapid Deployment and Flexibility

Ciena Packet Platform Summary

Model	NNI/UNI Ports	UNI Ports	Total Gbps	Power	Form Factor	Target Markets	Avail
3902	(1) 1G SFP	(1) 10/100/1000M RJ45	2	(1) External Universal AC	Plastic Clamshell	Business	GA
3903	(2) 100M/1G SFP	(1) 100M/1G SFP/RJ45	3	(2) Front Fixed AC or DC	1U, ETSI	Business	GA
3903x	(2) 100M/1G SFP	(1) 100M/1G SFP/RJ45	3	(1) External Universal AC	Plastic Clamshell	Business	GA
3904	(2) 100M/1G SFP	(2) 100M/1G SFP/RJ45	4	(2) Front Fixed AC or DC	1U, ETSI	Business, Indoor small cell	GA
3905	(2) 100M/1G SFP	(2) 100M/1G SFP/RJ45, PoE	4	(1) Fixed AC, DC, Cable AC	Outdoor	Business, small cell	GA
3906	(2) 100M/1G SFP	(2) 100M/1G SFP/RJ45 (2) 10/100/1000M RJ45	6	(2) Front Fixed AC (1) Front Fixed AC	1U, ETSI Module Slot	Business	GA
3916	(2) 100M/1G SFP	(2) 100M/1G SFP + (2) 100M/1G SFP/RJ45	6	(2) Front Fixed AC (1) Front Fixed AC (1) Front Fixed DC	1U ETSI	Res, Business, Transport	GA
3926	(6) 10G/1G SFP+	(2) 100M/1G SFP	82	(2) Front Plug AC or DC	1U, ETSI Module Slot	MBH, Business	GA
3928	(4) 10G/1G SFP+	(4) 100M/1G SFP (4) 1G SFP	48	(2) Front Fixed AC or DC	1U ETSI	MBH, Business	GA
3930	(2) 1G/10G SFP+	(4) 100M/1G SFP + (4) 100M/1G SFP/RJ45	28	(2) Front Plug AC or DC	1U ETSI	MBH, Business	GA
3931	(2) 1G/10G SFP+	(4) 100M/1G SFP + (4) 10/100/1000 RJ45	28	(2) AC or DC Option	Outdoor	MBH	GA
3942	(4) 1G/10G SFP+	(20) 10/100/1000 RJ45	60	(2) Front Plug AC or DC	1U ETSI	MDU, Business	GA
5142	(4) 10G/1G SFP+	(20) 100M/1G SFP	60	(2) Front Plug AC or DC	1U ETSI	Aggregation	GA
5144	(28) 1G + (8) 10G	(29) 1G + (8) 10G	120	2) Front Plug AC or DC	1U ETSI	Aggregation	GA
5150	(2) Dual 10G XFP Option Slots	(48) 100M/1G SFP	88	(2) Front Plug AC or DC	2U ETSI	Aggregation	GA
5160	24 1/10G SFP+	(24) 10G/1G SFP+	240	(2) Front Plug AC or DC	1U ETSI	Aggregation	GA
5162	(2) 100G QSFP28 / 40G QSFP+	(40) 10G/1G SFP+	300	(2) Rear Plug AC or DC (2) Front fixed DC	1U ETSI 1U ETSI	Aggregation, WB	GA
5164	(32) 1G/10G/25G + (4) 100G/200G	(32) 1G/10G/25G + (4) 100G/200G	800	(2) Front Plug AC or DC	1U ETSI	Aggregation, xHaul	3QFY20
5166	(32) 1G/10G/25G + (2) 100G/200G/400G	(32) 1G/10G/25G + (2) 100G/200G/400G	800	(2) Front Plug AC or DC	1U ETSI	Aggregation, xHaul	3QFY20
5168	(32) 1G/10G/25G + (4) 100G/200G / (14) 1G/10G/25G + (18) CPRI + (4) 100G/200G	(32) 1G/10G/25G + (4) 100G/200G / (14) 1G/10G/25G + (18) CPRI + (4) 100G/200G	800	(2) Front Plug AC or DC	1U ETSI	Aggregation, xHaul	4QCY20
5170	(4) 100G QSFP28 / 40G QSFP+	(40) 10G/1G SFP+	800	(2) Rear Plug AC or DC	1U ETSI	Aggregation, 100G NTE	GA
5171	(2) 200G Module Slots, 2xQSFP28,1xQSFP28+1xCFP2	(4) 25G/10G/1G SFP28 (36) 10G/1G SFP+	800	(2) Front Plug AC or DC	2U ETSI	Aggregation, 100G NTE	GA
8180	(4) 800G Module Slots, 400G WLAI Sled	(32) 100G/40G QSFP28	6.4T	(2) Front Plug AC or DC	2U ETSI	Aggregation, 100G NTE	GA
8700	(20) 1G/10G SFP+ , (2) 40G/100G CFP, (1) 100G QSFP28/40G QSFP+ & (10) 10G/1G SFP+ modules		800/2T	(2 or 4) Rear Plug AC or DC	6U or 10U 4 or 10 slot	Aggregation	GA

Where can I find out more?

Have questions? We have answers

Thank You